Mathematics Toolkit: Grade 8 Objective 2.E.1.a

Standard 2.0 Knowledge of Geometry

Topic E. Transformations

Indicator 1. Analyze a transformation on a coordinate plane

Objective a. Identify, describe, and plot the results of multiple transformations on a coordinate plane

Assessment Limits:

Identify or plot the result of two transformations on one figure using translations (horizontal or vertical), reflections (horizontal or vertical), or rotations about a given point (90° or 180°)

Table of Contents

Objective 2.E.1.a Tools

Lesson Seeds

Mathematics Grade 8 Objective 2.E.1.a Assessment Limit 1

Materials needed

Coordinate grids for each student, transparency coordinate grid (teacher), worksheets with polygons (basic polygons, i.e., square, rectangle, triangle) for each student, colored transparency polygons (square, rectangle, triangle, pentagon) (teacher).

Activities

Make sure your polygons fit exactly on the grid paper i.e. the coordinates of their vertices are integral. One way to do this is to color shapes on one copy of the grid, cut them out, and paste them onto a worksheet.

- Model the different transformations for the students using an overhead copy of the materials. The class should initially agree on a "starting point" for the square and shade that shape on their coordinate grid (later this starting point can be left to the discretion of the students). Working in pairs, student #1 performs one (and later two) transformation(s) with the polygon. The other student using the shaded starting point, the new position of the polygon must identify — using the terms translation, rotation, and reflection — what type of transformation has taken place, and the coordinates of the image. The "identifying" student must be able to justify his/her answer by demonstrating the transformation upon the polygon.

- The game can also be played by having one student describe a transformation, and the other move the polygon.

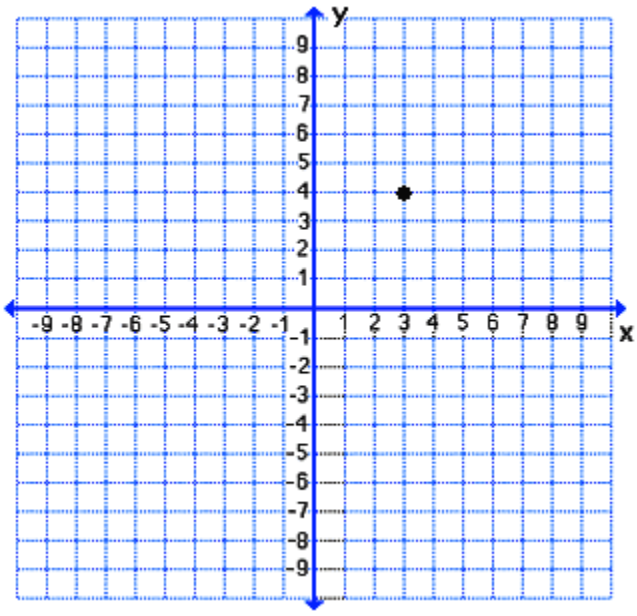
- As students improve at the game you may give them additional polygons to transform. They will then incorporate two or more transformations on the polygons.

Note: Students should be made aware that the results of some transformations can look alike, i.e. a translation of a square, might appear to also be a reflection of that same square.

Sample Item #1 - Selected Response (SR) Item

Mathematics Grade 8 Objective 2.E.1.a

The point (3, 4) is plotted on the coordinate plane below.



What are the coordinates of the point after a 90° counterclockwise rotation about the origin followed by a translation 5 units to the left?

A. (-9, 3)
B. (-4, 3)
C. (-1, -3)
D. (1, 3)

Correct Answer:
A